भारतीय मानक

Indian Standard

IS 5531 : 2014

(Reaffirmed 2020)

पानी और मल जल की दबाब पाइपों के ऐस्बेस्टॉस सीमेंट के लिए ढलॅवा लोहे के घटक — विशिष्टि

(तीसरा पुनरीक्षण)

Cast Iron Specials for Asbestos Cement Pressure Pipes for Water and Sewage — Specification

(Third Revision)

ICS 23.040.04; 91.100.40

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Price Group 8

Pig Iron and Cast Iron Sectional Committee, MTD 06

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Pig Iron and Cast Iron Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1969 and subsequently revised in 1977 and 1988. In this revision, following major modifications have been effected:

a) Alternative jointing system other than details given in this specification have been allowed as per current practice for different types of pipe materials.
b) Type test of joint to prove the efficacy of the joint design has been included corresponding to the class of joint.
c) All CI fittings for asbestos cement pipes are to be machined. The outside diameter of these plain ended fittings should be compatible with class of asbestos cement pipes with which they are to be used. There are four pressure classes of pipes with four machined outside diameters. To reduce the number of patterns and core boxes only two outside diameters of the plain ends have been proposed. There is a provision to machine the plain ends as required to fit the particular class of pipes to be used.
d) As per standard practice of cast iron fittings specifications for other types of pipes, the weight of each castings have been omitted. The tolerance of weight has also been omitted.
e) For smoother hydraulic flow and prevention of tuberculation and corrosion, inside lining by cement mortar has been added as an optional requirement. Other types of linings such as epoxy, ceramic epoxy and polyurethane have been allowed as optional.
f) In the earlier version all socket fittings were introduced, but since none of the manufacturers wanted to produce such fittings, this type was withdrawn in later revisions.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CAST IRON SPECIALS FOR ASBESTOS CEMENT PRESSURE PIPES FOR WATER AND SEWAGE — SPECIFICATION

(Third Revision)

1 SCOPE

1.1 This standard covers the requirements for cast iron specials to be used with asbestos cement pressure pipes for water and sewage.

1.1.1 This standard is applicable to cast iron specials for use with asbestos cement pressure pipes suitable for connection with cast iron detachable joints or asbestos cement couplings.

1.2 Cast iron specials to be used with asbestos cement pressure pipes may have plain ends or flanged ends. In case of plain ends, cast iron detachable joints or asbestos cement couplings may be used with them.

1.2.1 Joint design other than the design given in that standard are outside the scope of this standard. The standard does not restrict the future developments of joints as long as critical dimensions are maintained to match the outside diameter of the plain end of the pipe of the same class, for which it is designed.

1.3 The fittings covered by this standard are normally supplied with externally and internally coated to protect against corrosion.

1.4 The fittings are to be suitable for fluid temperatures between 0°C and 50°C, excluding frost.

1.5 Whereas requirements of cast iron specials for use with a.c. pressure pipes conforming to IS 1592 have been covered in this standard.

2 REFERENCES

The following Indian Standards contains provisions, which, through reference in this text, constitute provisions of this standard. At the time of the publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

IS No.	*Title*
210 : 2009	Grey iron castings (*fifth revision*)
1387 : 1993	General requirements for the supply of metallurgical materials (*second revision*)
1500 : 2005/ ISO 6506-1 : 1999	Method for Brinell hardness test for metallic materials (*third revision*)
1592 : 2003	Asbestos cement pressure pipes and joints (*fourth revision*)

3 SUPPLY OF MATERIAL

The general requirements relating to the supply of the materials shall be as laid down in IS 1387.

4 MANUFACTURE

4.1 The metal used for the manufacture of the specials shall be of requisite quality conforming to any of the grade specified in IS 210.

4.2 The castings shall be stripped with all precautions necessary to avoid warping or shrinking defects. The castings shall be free from defects other than any unavoidable surface imperfections which result from the method of manufacture and which do not affect the use of the specials. By agreement between the purchaser and the manufacturer, minor defects may be rectified.

4.3 In the case of flanged joints, the flanges shall be at right angle to the axis of the joint. The bolt holes shall be drilled.

4.4 The casting shall be such that they could be cut, drilled or machined with the tools normally used for installation. In case of dispute, the castings may be accepted provided (the hardness of the external un-machined surface does not exceed 215 HBW.

4.5 Where castings required to withstand pressure higher than those specified in this standard, the castings may be strengthened by means of increased wall thickness, if necessary, at the expense of the internal diameter or by suitable ribbing or as may be mutually agreed to between the manufacturer and the purchaser, to suit the pressure specified by the purchaser.

5 WALL THICKNESS AND CLASSIFICATION

The wall thickness of the fittings given in this standard are suitable for maximum working pressure of

2.5 MPa. The minimum thickness of the fittings has been limited to 8.6 mm. The specified thickness of each casting has been specified in the Tables 3 to 10.

6 MECHANICAL TESTS

6.1 Mechanical test shall be carried out during manufacture by batch sampling system. Samples shall be taken, at the manufacturer's option, either from a sample attached to the casting or from a sample cast separately. In the later case, it shall be cast from the same metal as that used for the casting. The mechanical properties of samples being representative of finished products are tested for tensile strength and hardness to verify mechanical properties. Two tests per 24 h of casting shall be adequate. The results obtained are taken lo represent all the castings of all sizes made during that period.

6.2 Tensile Test

Two tensile tests shall be made on bars cast from the same metal as specified in Annex A. The results of the tests shall show a minimum tensile strength of 150 MPa.

6.3 Brinell Hardness Test

For checking the Brinell hardness specified in **3.4**, tests shall be carried out on the test bars used for the tests in **4.1** in accordance with IS 1500.

6.4 Retest

If any test piece representing a lot fails to pass the test in the first instance, two additional tests shall be made on test pieces made from the same metal used for the same lot. Should any of these additional test pieces fail to pass the test; the lot shall be deemed as not complying with the standard.

6.5 All spigot ends are to be machined to a length of 90 mm with fine grade machining so that the joints do not leak in the performance test.

7 HYDROSTATIC TEST

7.1 For hydrostatic test, the specials shall be kept under pressure (*see* **7.1.1**) for a period of minimum 15 s and, may be struck moderately with a 700-g hammer. They shall withstand the pressure test without showing any leakage, sweating or other defects of any kind. The hydrostatic test shall be conducted before coating the castings.

7.1.1 The specials shall withstand test pressure specified in Table 1.

Table 1 Hydrostatic Test Pressure for Castings

(*Clause* 7.1.1)

Class	Hydrostatic Test Pressure at Works (MPa)
10 and 15	1.5
20 and 25	2.5

7.1.2 When the specials are required for higher pressures, the test pressure are subject to agreement between the purchaser and the manufacturer.

8 SIZES

8.1 The standard of nominal size DN of the fittings covered in this standard are 80, 100, 125, 150, 200, 250, 300, 350, 400, 450, 500 and 600 mm.

NOTE — Nominal size is a number used to classify fittings/joints/castings and corresponds approximately to their internal diameter.

9 DIMENSIONS

9.1 The dimensions of the fittings and their machined plain end shall be as specified in Tables 2 to 12.

NOTES

1 Nominal diameter of cast iron fittings shall refer to the corresponding nominal diameter of the a.c. pressure pipe of IS 1592.

2 Cast iron fittings for nominal dia more than 600 mm may also be manufactured. In such case, detailed dimensions may be as mutually agreed to between the purchaser and the supplier.

9.2 The outside diameter of the engagement end of a special shall be machined and should match the corresponding outside diameter of the asbestos cement pressure pipe of different classes conforming to IS 1592.

9.3 The engagement length shall be not less than 90 mm.

10 TOLERANCES ON DIMENSIONS

10.1 Thickness

Tolerances on the wall thickness and flange thickness of the specials shall be as follows:

Dimension	*Tolerance*
Wall thickness, e	(– 2.00 mm + 0.05 e) (*see* Note)
Flange thickness, b	($\pm$3.00 mm + 0.05 b)

where

e = standard thickness of the wall in mm, and

b = standard thickness of the flange in ram.

NOTE — No limit for the plus tolerances is specified.

10.2 Other Dimensions

Tolerances on other dimensions shall be as under:

Dimension	*Tolerance*, mm
Machined outside diameter	+ 1.5
(D_2 and d_2)	– 1.0
Length (l) and	+ 15
Height (h)	– 10

11 COATING

11.1 After inspection and hydrostatic test, each casting shall be coated with bitumen as specified in **11.2** to **11.6**.

11.2 Bitumen or similar coating shall not be applied to any castings, unless its surface is clean, dry and free from rust.

11.3 Unless otherwise agreed to between the purchaser and the manufacturer, all castings shall be coated externally and internally with the same material, the castings being preheated prior to total immersion in a bath containing a uniformly heated composition, having a bituminous tar or other suitable base.

NOTE — For specials used for carrying potable water. coal tar should not be used.

11.4 Alternatively, the coating on the castings may be done without preheating with approved coating mutually agreed to between the manufacturer and the purchaser, if agreed to at the time of enquiry and order.

11.5 The bitumen coating material shall set rapidly with good adherence and shall not scale off.

11.6 In all instances, where the coating material has a bituminous or similar base, it shall be smooth and tenacious, and hard enough not to flow.

11.7 Then the specials arc to be used for conveying potable water, the inside coating shall not contain any constituent soluble in such water or any ingredient which could impart any taste or odour whatsoever to the potable water after sterilization and suitably washing of the mains.

11.8 In the case of castings (wholly or partially coated) which are imperfectly coated or where the coating does not set or conform to the quality specified above, the coating shall be removed and the castings recoated.

12 MARKING

12.1 Each special shall have cast stamped or indelibly painted on it the following:

a) Manufacturer's name, initials or identification mark;
b) Nominal diameter;
c) Class reference;
d) Last two digits of the year of manufacture; and
e) Any other mark, if required by the purchaser.

12.1.1 Marking may be done on the barrels of the specials.

12.2 BIS Certification Marking

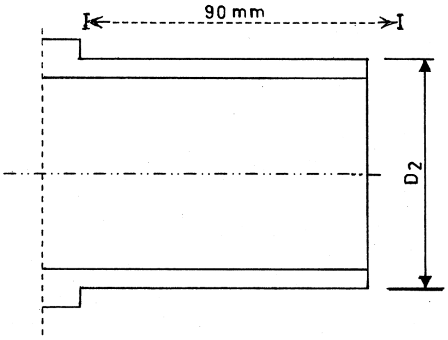
The material may also be marked with the Standard Mark.

12.2.1 The use of he Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Table 2 Machined Plain Ends of the CI Fittings

(*Clause* 9.1)

All dimensions in millimetres.

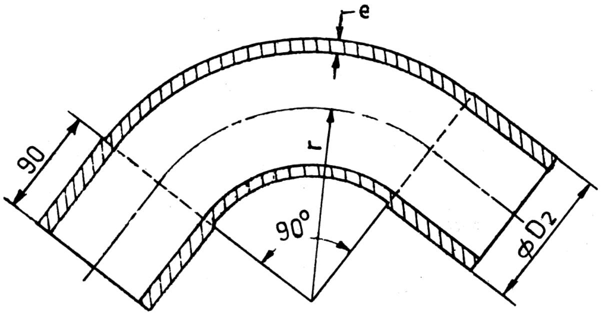


Nominal Diameter DN (1)	Class Bar (2)	Barrel Wall Thickness mm (3)	Nominal Outside Diameter mm (4)	Machined Outside Dia of the CI Fitting D_2 mm (5)
80	10, 15	8.6	100	99.5
	20,	10.0	107	101.5
	25	10.0	107	106.5
100	10	9.0	122	120.0
	15	9.0	122	121.0
	20	10.5	128	126.5
	25	10.5	128	132.5
125	10	9.5	147	145.0
	15	9.5	147	147.0
	25	11.1	154	152.5
		11.1	154	159.5
150	10	10.0	177	171.0
	15	10.0	177	176.5
	20	11.7	185	183.0
	25	11.7	185	191.0
200	15	11.0	234	233.5
	20	12.8	245	242.5
	15	12.8	245	253.5
250	15	12.0	285	284.5
	20	14.0	298	294.5
	25	14.0	298	305.5
300	15	13.0	341	340.5
	20	15.2	354	352.5
	25	15.2	354	366.5
350	15	14.0	394	392.0
	20	16.3	408	405.0
	25	17.9	408	419.0
400	15	15.0	450	448.0
	20	17.5	470	463.0
	25	19.3	470	478.0
450	15	16.0	500	498.0
	20	18.7	520	515.0
	25	20.6	520	532.0
500	15	17.0	556	554.5
	20	19.8	577	572.5
	25	21.8	577	591.5
600	15	19.0	670	665.5
	20	22.2	690	686.5
	25	24.4	690	710.5

Table 3 Dimensions of Cast Iron Plain-End Bends (90°)

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



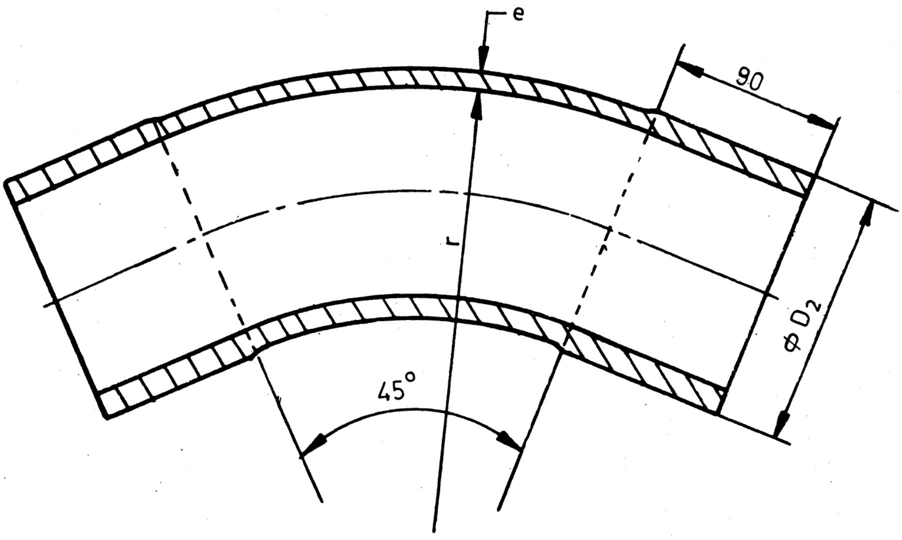
D_2 = machined outside diameter of asbestos cement pressure pipe as given in Table 1.

Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness 'e' (3)	Radius 'r' (4)	Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness 'e' (3)	Radius 'r' (4)
80	15	8.6	137	300	15	13.0	335
	25	10.0	137		25	15.2	335
100	15	9.0	155	350	15	14.0	380
	25	10.5	155		25	17.9	380
125	15	9.5	177.5	400	15	15.0	425
	25	11.1	177.5		25	19.3	425
150	15	10.0	200	450	15	16.0	470
	25	11.7	200		25	20.6	470
200	15	11.0	245	500	15	17.0	515
	25	12.8	245		25	21.8	515
250	15	12.0	290	600	15	19.0	605
	25	14.0	290		25	24.4	605

Table 4 Dimensions of Cast Iron Plain-End Bends (45°)

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



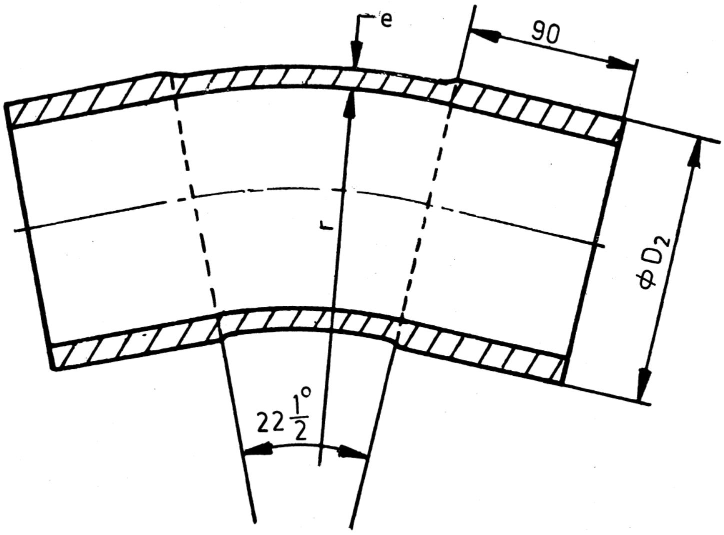
D_2 = machined outside diameter of asbestos cement pressure pipe as given in Table 1.

Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness *'e'* (3)	Radius *'r'* (4)	Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness *'e'* (3)	Radius *'r'* (4)
80	15	8.6	280	300	15	13.0	500
	25	10 0	280		25	15.2	500
100	15	9.0	300	350	15	14.0	550
	25	10.5	300		25	17.9	550
125	15	9.5	325	400	15	15.0	600
	25	11.1	325		25	19.3	600
							600
150	15	10.0	350	450	15	16.0	650
	25	11.7	350		25	20.6	650
200	15	11.0	400	500	15	17.0	700
	25	12.8	400		25	21.8	700
250	15	12.0	450	600	15	19.0	800
	25	14.0	450		25	24.4	800

Table 5 Dimensions of Cast Iron Plain-End Bends (22½°)

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



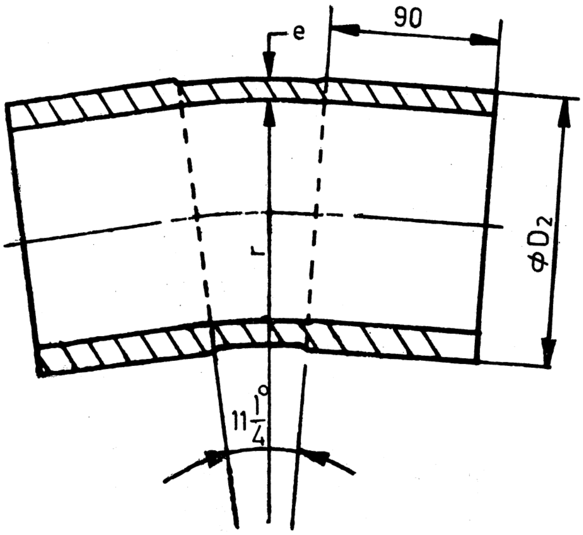
D_2 = machined outside diameter of asbestos cement pressure pipe as given in Table 1.

Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness 'e' (3)	Radius 'r' (4)	Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness 'e' (3)	Radius 'r' (4)
80	15	8.6	280	300	15	13.0	500
	25	10.0	280		25	15.2	500
100	15	9.0	300	350	15	14.0	550
	25	10.5	300		25	17.9	550
125	15	9.5	325	400	15	15.0	600
	25	11.1	325		25	19.3	600
150	15	10.0	350	450	15	16.0	650
	25	11.7	350		25	20.6	650
200	15	11.0	400	500	15	17.0	700
	25	12.8	400		25	21.8	700
250	15	12.0	450	600	15	19.0	800
	25	14.0	450		25	24.4	800

Table 6 Dimensions of Cast Iron Plain-End Bends (11¼°)

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



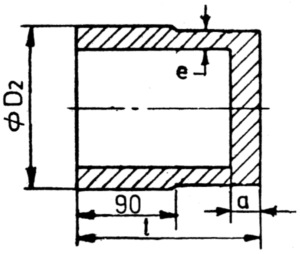
D_2 = machined outside diameter of asbestos cement pressure pipe as given in Table 1.

Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness 'e' (3)	Radius 'r' (4)	Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness 'e' (3)	Radius 'r' (4)
80	15	8.6	280	300	15	13.0	500
	25	10.0	280		25	15.2	500
100	15	9.0	300	350	15	14.0	550
	25	10.5	300		25	17.9	550
125	15	9.5	325	400	15	15.0	600
	25	11.1	325		25	19.3	600
150	15	10.0	350	450	15	16.0	650
	25	11.7	350		25	20.6	650
200	15	11.0	400	500	15	17.0	700
	25	12.8	400		25	21.8	700
250	15	12.0	450	600	15	19.0	800
	25	14.0	450		25	24.4	800

Table 7 Dimensions of Cast Iron Plain-End Plugs

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



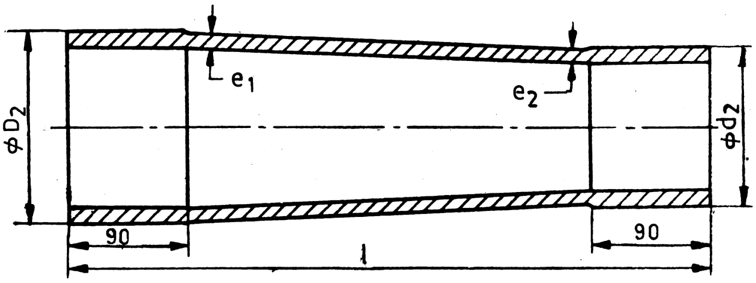
D_2 = machined outside diameter of asbestos cement pressure pipe as given in Table 1.

Nominal Diameter DN (1)	Class (2)	Wall Thickness *'e'* (3)	End Thickness *'a'* (4)	Length *'l'* (5)	Nominal Diameter DN (1)	Class (2)	Wall Thickness *'e'* (3)	End Thickness *'a'* (4)	Length *'l'* (5)
80	15	8.6	21	125	300	15	13.0	27.5	160
	25	10.0	21	125		25	15.2	27.5	160
100	15	9.0	22	130	350	15	14.0	29.0	165
	25	10.5	22	130		25	17.9	29.0	165
125	15	9.5	22.5	135	400	15	15.0	30.0	170
	25	11.1	22.5	135		25	19.3	30.0	170
150	15	10.0	23.0	140	450	15	16.0	31.5	175
	25	11.7	23.0	140		25	20.6	31.5	175
200	15	11.0	24.5	150	500	15	17.0	33.0	180
	25	12.8	24.5	150		25	21.8	33.0	180
250	15	12.0	26.0	155	600	15	19.0	36.0	185
	25	14.0	26.0	155		25	24.4	36.0	185

Table 8 Dimensions of Cast Iron Plain-End Reducers

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



D_2 = machined outside diameter of asbestos cement pressure pipe at the large end as given in Table 1.

d_2 = machined outside diameter of asbestos cement pressure pipe at the small end as given in Table 1.

Nominal Diameter DN	Class	Barrel Wall Thickness		Total Length
		e_1	e_2	l
(1)	(2)	(3)	(4)	(5)
100 x 80	15	9.0	8.6	400
	25	10.0	10.0	400
125 x 80	15	9.5	8.6	400
	25	11.1	10.0	400
125 x 100	15	9.5	9.0	400
	25	11.1	10.5	400
150 x 80	15	10.0	8.6	400
	25	11.7	10.0	400
150 x 100	15	10.0	9.0	400
	25	11.7	10.5	400
150 x 125	15	10.0	9.5	400
	25	11.7	11.1	400
200 x 100	15	11.0	9.0	400
	25	12.8	10.5	400
200 x 125	15	11.0	9.5	400
	25	12.8	11.1	400
200 x 150	15	11.0	10.0	400
	25	12.8	11.7	400
250 x 125	15	12.0	9.5	400
	25	14.0	11.1	400
250 x 150	15	12.0	10.0	400
	25	14.0	11.7	400
250 x 200	15	12.0	11.0	400
	25	14.0	12.8	400
300 x 450	15	13.0	10.0	400
	25	15.2	11.7	400
300 x 200	15	13.0	11.0	400
	25	15.2	12.8	400
300 x 250	15	13.0	12.0	400
	25	15.2	14.0	400
350 x 200	15	14.0	11.0	600
	25	17.9	12.8	600
350 x 250	15	14.0	12.0	600
	25	17.9	14.0	600

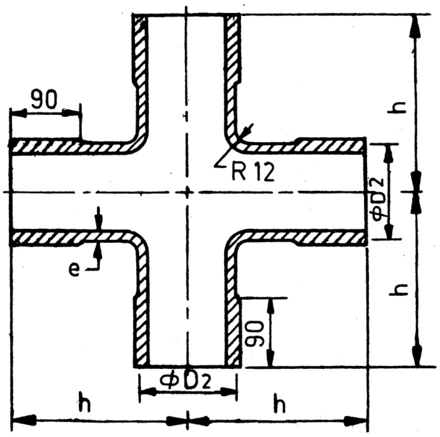
Table 8 (*Concluded*)

Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness e_1 (3)	Barrel Wall Thickness e_2 (4)	Total Length l (5)
350 × 300	15	14.0	13.0	600
	25	17.9	15.2	600
400 × 250	15	15.0	12.0	600
	25	19.3	14.0	600
400 × 300	15	15.0	13.0	600
	25	19.3	15.2	600
400 × 350	15	15.0	14.0	600
	25	19.3	17.9	600
450 × 350	15	16.0	14.0	600
	25	20.6	17.9	600
450 × 400	15	16.0	15.0	600
	25	20.6	19.3	600
500 × 350	15	17.0	14.0	600
	25	21.8	17.9	600
500 × 400	15	17.0	15.0	600
	25	21.8	19.3	600
500 × 450	15	17.0	16.0	600
	25	21.8	20.6	600
600 × 400	15	19.0	15.0	600
	25	24.4	19.3	600
600 × 450	15	19.0	16.0	600
	25	24.4	20.6	600
600 × 500	15	19.0	17.0	600
	25	24.4	21.8	600

Table 9 Dimensions of Cast Iron Crosses

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



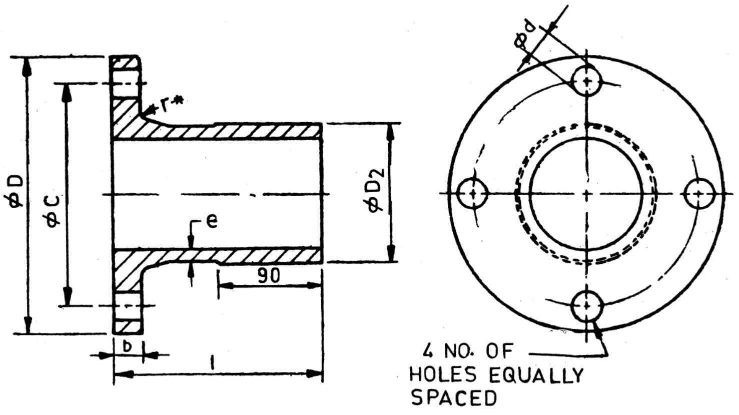
D_2 = machined outside diameter of asbestos cement pressure pipe as given in Table 1.

Nominal Diameter DN (1)	Class (2)	Barrel Wall Thickness *e* (3)	Half Length *h* (4)
80	15	8.6	180
	25	10.0	180
100	15	9.5	200
	25	11.1	200
125	15	9.5	225
	25	11.1	225
150	15	10.0	250
	25	11.7	250
200	15	10.0	300
	25	11.7	300
250	15	10.0	350
	25	11.7	350
300	15	11.0	400
	25	12.8	400
350	15	14.0	450
	25	17.9	450
400	15	15.0	500
	25	19.3	500
450	15	16.0	550
	25	20.6	550
500	15	17.0	600
	25	21.8	600
600	15	19.0	700
	25	24.4	700

Table 10 Dimensions of Cast Iron Plain-End Flanged Spigots

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



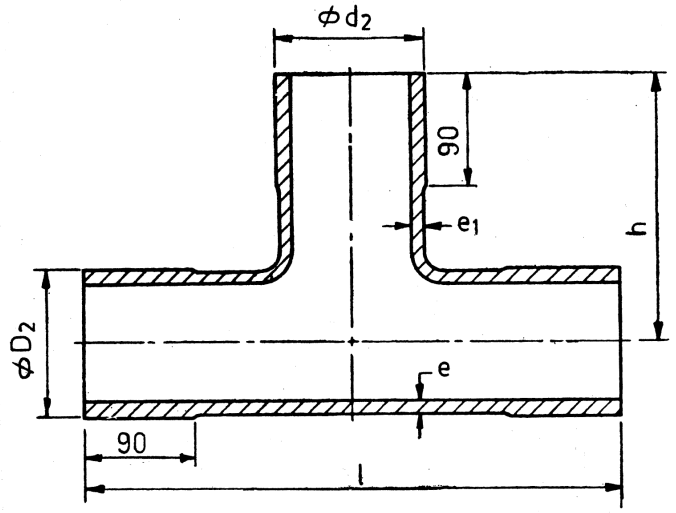
D_2 = machined outside diameter of asbestos cement pressure pipe as given in Table 1.

DN (mm)	Class	Nominal Dimensions					Holes		Dia of Bolts	Length *l*
		D_2	*D*	*C*	*b*	*e*	Ne	Dia		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
80	15	99 .5	200	160	21.0	8.6	4	19	16	200
	25	106.5	200	160	21.0	10.0	4	19	16	200
100	15	121.0	220	180	22.0	9.0	8	19	16	200
	25	132.5	220	180	22.0	10.5	8	19	16	200
125	15	147.0	250	210	22.5	9.5	8	19	16	200
	25	159.5	250	210	22.5	11.1	8	19	16	200
150	15	176.5	285	240	23.0	10.0	8	23	20	200
	25	191.0	285	240	23.0	11.7	8	23	20	200
200	15	233.5	340	295	24.5	11.0	8	23	20	200
	25	253.5	340	295	24.5	12.8	8	23	20	200
250	15	284.5	395	350	26.0	12.0	12	23	20	300
	25	305.5	395	350	26.0	14.0	12	23	20	300
300	15	340.5	445	400	27.5	13.0	12	23	20	300
	25	366.5	445	400	27.5	15.2	12	23	20	300
350	15	392.0	505	460	29.0	14.0	16	23	20	300
	25	419.0	505	460	29.0	17.9	16	23	20	300
400	15	448.0	565	515	30.0	15.0	16	28	24	300
	25	478.0	565	515	30.0	19.3	16	28	24	300
450	15	498.0	615	564	31.5	16.0	20	28	24	300
	25	532.0	615	564	31.5	20.6	20	28	24	300
500	15	554.5	670	620	33.0	17.0	20	28	24	300
	25	591.5	670	620	33.0	21.8	20	28	24	300
600	15	665.5	780	725	36.0	19.0	20	31	28	300
	25	710.5	780	725	36.0.	24.2	20	31	28	300

Table 11 Dimensions of Cast Iron Plain-End Tees

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



D_2 = machined outside diameter of asbestos cement pressure pipe in main line as given in Table 1.

d_2 = machined outside diameter at the reducer end in branch line as given in Table 1.

Nominal Diameter DN	Class	Barrel Thickness		Length	
		Main e	Branch e_1	Main	Branch
(1)	(2)	(3)	(4)	(5)	(6)
80 × 80	15	10.0	8.6	360	180
	25	10.0	10.0	360	180
100 × 80	15	9.0	9.0	400	190
	25	10.5	10.5	400	190
100 × 100	15	10.5	9.0	400	200
	25	10.5	10.5	400	200
125 × 80	15	9.5	9.5	450	202.5
125 × 100	25	11.1	11.1	450	202.5
	15	9.5	9.5	450	212.5
	25	11.1	11.1	450	212.5
125 × 125	5,10	9.5	9.5	450	225
	15	9.5	9.5	450	225
	20	11.1	11.1	450	225
	25	11.1	11.1	450	225
150 × 80	15	10.0	10.0	500	215
	25	11.7	11.7	500	215
150 × 100	15	10.0	10.0	500	225
	25	11.7	11.7	500	225
150 × 125	15	10.0	10.0	500	237.5
	25	11.7	11.7	500	237.5
150 × 150	15	10.0	10.0	500	250
	25	11.7	11.7	500	250
200 × 80	15	11.0	11.0	600	240
	25	12.8	12.8	600	240
200 × 100	15	11.0	11.0	600	250
	25	12.8	12.8	600	250
	15	11.0	11.0	600	262.5

Table 11 (*Continued*)

Nominal Diameter DN	Class	Barrel Thickness		Length	
		Main e	Branch e_1	Main	Branch
(1)	(2)	(3)	(4)	(5)	(6)
200 × 125	25	12.8	12.8	600	262.5
	15	11.0	11.0	600	275
200 × 150	25	12.8	12.8	600	275
	15	11.0	11.0	600	300
200 × 200	25	12.8	12.8	600	300
	15	12.0	11.1	700	265
250 × 80	25	14.0	13.0	700	265
	15	12.0	11.6	700	275
250 × 100	20	14.0	13.5	700	275
	25	14.0	13.5	700	275
250 × 125	15	12.0	12.0	700	287.5
	25	14.0	14.0	700	287.5
250 × 150	15	12.0	12.0	700	300
	25	14.0	14.0	700	300
250 × 200	15	12.0	12.0	700	325
	25	14.0	14.0	700	325
250 × 250	15	12.0	12.0	700	350
	25	14.0	14.0	700	350
300 × 80	15	13.0	13.0	800	290
	25	15.2	15.2	800	290
300 × 100	15	13.0	13.0	800	300
	25	15.2	15.2	800	300
300 × 125	15	13.0	13.0	800	312.5
	25	15.2	15.2	800	312.5
300 × 150	15	13.0	13.0	800	325
	25	15.2	15.2	800	325
300 × 200	15	13.0	13.0	800	350
	25	15.2	15.2	800	350
300 × 250	15	13.0	13.0	800	375
	25	15.2	15.2	800	375
300 × 300	15	13.0	13.0	800	400
	25	15.2	15.2	800	400
350 × 200	15	14.0	14.0	900	400
	25	17.9	17.9	900	400
350 × 250	15	14.0	14.0	900	400
	25	17.9	17.9	900	400
350 × 300	15	14.0	14.0	900	425
	25	17.9	17.9	900	425
350 × 350	15	14.0	14.0	900	450
	25	17.9	17.9	900	450
400 × 200	15	15.0	14.1	1 000	400
	25	19.3	18.2	1 000	400

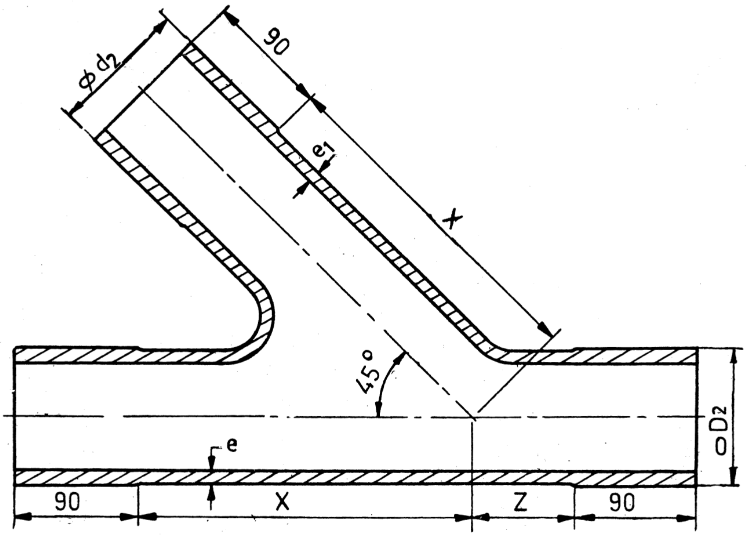
Table 11 (*Concluded*)

Nominal Diameter DN (1)	Class (2)	Barrel Thickness Main e (3)	Barrel Thickness Branch e_1 (4)	Length Main (5)	Length Branch (6)
400 × 250	15	15.0	15.0	1 000	425
	25	19.3	19.3	1 000	425
400 × 300	15	15.0	15.0	1 000	450
	25	19.3	19.3	1 000	450
400 × 350	15	15.0	15.0	1 000	475
	25	19.3	19.3	1 000	475
400 × 400	15	15.0	15.0	1 000	500
	25	19.3	19.3	1 000	500
450 × 250	15	16.0	15.4	1 100	450
	25	20.6	19.8	1 100	450
450 × 300	15	16.0	16.0	1 100	475
	25	20.6	20.6	1 100	475
450 × 350	15	16.0	16.0	1 100	500
	25	20.6	20.6	1 100	500
450 × 400	15	16.0	16.0	1 100	525
	25	20.6	20.6	1 100	525
450 × 450	15	16.0	16.0	1 100	550
	25	20.6	20.6	1 100	550
500 × 250	15	17.0	15.4	1 200	475
	25	21.8	19.8	1 200	475
500 × 300	15	17.0	16.7	1 200	500
	25	21.8	21.5	1 200	500
500 × 350	15	17.0	17.0	1 200	525
	25	21.8	21.8	1 200	525
500 × 400	15	17.0	17.0	1 200	550
	25	21.8	21.8	1 200	550
500 × 450	15	17.0	17.0	1 200	575
	25	21.8	21.8	1 200	575
500 × 500	15	17.0	17.0	1 200	600
	25	21.8	21.8	1 200	600
	15	19.0	16.7	1 400	550
600 × 300	25	24.4	21.5	1 400	550
	15	19.0	18.0	1 400	575
600 × 350	25	24.4	23.1	1 400	575
	15	19.0	19.0	1 400	600
600 × 400	25	24.4	24.4	1 400	600
	15	19.0	19.0	1 400	625
600 × 450	25	24.4	24.4	1 400	625
600 × 500	15	19.0	19.0	1 400	650
	25	24.4	24.4	1 400	650
600 × 600	15	19.0	19.0	1 400	700
	25	24.4	24.4	1 400	700

Table 12 Dimensions of Cast Iron Plain-End Wyes

(*Clauses* 5 *and* 9.1)

All dimensions in millimetres.



d_2 = machined outside diameter of asbestos cement pressure pipe as given in Table 1.

d_2 = machined outside diameter at the branch end as given in Table 1.

Nominal Diameter DN (1)	Class (2)	Barrel Thickness Main e (3)	Barrel Thickness Branch e_1 (4)	Length l Main l (5)	Length l Branch h (6)
80 x 80	15	8.6	8.6	250	75
	25	10.0	10.0	250	75
100 x 80	15	9.0	8.6	300	75
	25	10.5	10.0	300	75
100 x 100	15	9.0	9.0	300	75
	25	10.5	10.5	300	75
125 x 80	15	9.5	8.6	335	75
	25	11.1	10.0	335	75
125 x 100	15	9.5	9.0	335	75
	25	11.1	10.5	335	75
125 x 125	15	9.5	9.5	335	75
	25	11.1	11.1	335	75
150 x 80	15	10.0	8.6	370	90
	25	11.7	10.0	370	90
150 x 100	15	10.0	9.0	370	90
	25	11.7	10.5	370	90
150 x 125	15	10.0	9.5	370	90
	25	11.7	11.1	370	90
150 x 150	15	10.0	10.0	370	90
	25	11.7	11.7	370	90
200 x 80	15	11.0	8.6	445	115
	25	12.8	10.0	445	115
200 x 100	15	11.0	9.0	445	115
	25	12.8	10.5	445	115
200 x 125	15	11.0	11.0	445	115
	25	12.8	12.8	445	115

Table 12 (*Continued*)

Nominal Diameter DN	Class	Barrel Thickness		Length *l*	
		Main *e*	Branch e_1	Main *l*	Branch *h*
(1)	(2)	(3)	(4)	(5)	(6)
200 × 150	15	11.0	11.0	445	115
	25	12.8	12.8	445	115
200 × 200	15	11.0	11.0	445	115
	25	12.8	12.8	445	115
250 × 80	15	12.0	8.6	520	125
	25	14.0	10.0	520	125
250 × 100	15	12.0	9.0	520	125
	25	14.0	10.5	520	125
250 × 125	15	12.0	9.5	520	125
	25	14.0	11.1	520	125
250 × 150	15	12.0	10.0	520	125
	25	14.0	11.7	520	125
250 × 200	15	12.0	11.0	520	125
	25	14.0	12.8	520	125
250 × 250	15	12.0	12.0	520	125
	25	14.0	14.0	520	125
300 × 80	15	13.0	8.6	625	140
	25	15.2	10.0	625	140
300 × 100	15	13.0	9.0	625	140
	25	15.2	10.5	625	140
300 × 125	15	13.0	9.5	625	140
	25	15.2	11.1	625	140
300 × 150	15	13.0	10.0	625	140
	25	15.2	11.7	625	140
300 × 200	15	13.0	11.0	625	140
	25	15.2	12.8	625	140
300 × 250	15	13.0	12.0	625	140
	25	15.2	14.0	625	140
300 × 300	15	13.0	13.0	625	140
	25	15.2	15.2	625	140
350 × 200	15	14.0	11.0	670	160
	25	17.9	12.8	670	160
350 × 250	15	14.0	12.0	670	160
	25	17.9	14.0	670	160
350 × 300	15	14.0	13.0	670	160
	25	17.9	15.2	670	160
350 × 350	15	14.0	14.0	670	160
	25	17.9	17.9	670	160
400 × 200	15	15.0	11.0	740	175
	25	19.3	12.8	740	175
400 × 250	15	15.0	12.0	740	175
	25	19.3	14.0	740	175
400 × 300	15	15.0	13.0	740	175
	25	19.3	15.2	740	175

Table 12 (*Concluded*)

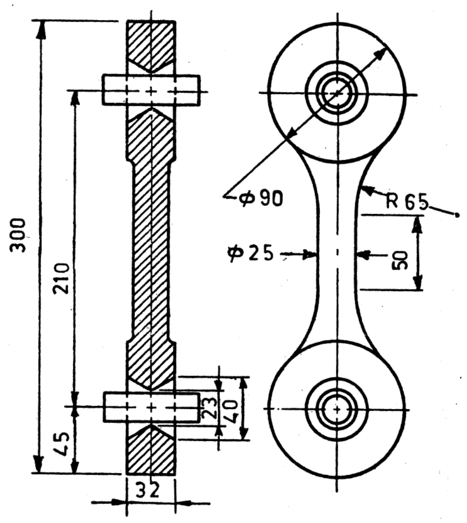
Nominal Diameter DN	Class	Barrel Thickness		Length l	
		Main e	Branch e_1	Main l	Branch h
(1)	(2)	(3)	(4)	(5)	(6)
400 × 350	15	15.0	14.0	740	175
	25	19.3	17.9	740	175
400 × 400	15	15.0	15.0	740	175
	25	19.3	19.3	740	175
450 × 250	15	16.0	15.4	820	190
	25	20.6	19.8	820	190
450 × 300	15	16.0	13.0	820	190
	25	20.6	15.2	820	190
450 × 350	15	16.0	14.0	820	190
	25	20.6	17.9	820	190
450 × 400	15	16.0	15.0	820	190
	25	20.6	19.3	820	190
450 × 450	15	16.0	16.0	820	190
	25	20.6	20.6	820	190
500 × 250	15	17.0	15.4	900	210
	25	21.8	19.8	900	210
500 × 300	15	17.0	13.0	900	210
	25	21.8	15.2	900	210
500 × 350	15	17.0	14.0	900	210
	25	21.8	17.9	900	210
500 × 400	15	17.0	15.0	900	210
	25	21.8	19.3	900	210
500 × 450	15	17.0	16.0	900	210
	25	21.8	20.6	900	210
500 × 500	15	17.0	17.0	900	210
	25	21.8	21.8	900	210
600 × 300	15	19.0	13.0	1 040	240
	25	24.4	15.2	1 040	240
600 × 350	15	19.0	14.0	1 040	240
	25	24.4	17.9	1 040	240
600 × 400	15	19.0	15.0	1 040	240
	25	24.4	19.3	1 040	240
600 × 450	15	19.0	16.0	1 040	240
	25	24.4	20.6	1 040	240
600 × 500	15	19.0	17.0	1 040	240
	25	24.4	21.8	1 040	240
600 × 600	15	19.0	19.0	1 040	240
	25	24.4	22.4	1 040	240

ANNEX A

(*Clause* 6.2)

TEST BARS FOR TENSILE TEST ON CAST IRON SPECIALS CAST IN SAND MOULDS

The (test bars for tensile tests shall be properly moulded free form defects. These may be either unmachined or machined to give a diameter of about 20 to 25 mm. The ends shall be selected by the manufacturer to fit the tensile testing machine. Figure 1 shows one satisfactory design.



All dimensions in millimetres.

FIG. 1 TENSILE TEST SPECIMEN

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